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ABSTRACT

The information system for the Los Angeles City School District has been designed to provide relevant information in a readily available and concise manner. Equally important to the effectiveness of the information system, however, is that the decisionmaker have the capability to actually use the information. This report describes an in-service training program that will help insure that the decisionmaker has the necessary tools to process the information provided by the system in a productive manner. The course content of the program covers the basic concepts and tools needed in order to use the information generated. Special emphasis is given to an orientation to the information system in terms of its inputs and outputs. A format for conducting the in-service training program is suggested. This format includes the time period of instruction, the method, the materials and the nature of the participants and the staff. (Other reports in this series are: LI003908 through 003911). (Author)

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AN INFORMATION SYSTEM FOR EDUCATIONAL MANAGEMENT: An In-Service Training Program

Lawrence Dougharty
Sue Haggart

Prepared for the Los Angeles Unified School District

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PREFACE

In response to community, legislative, and student pressures, school administrators have recently begun to examine the potential of modern management tools and practices. This search for techniques that might function effectively in an educational context led to the adaptation of such methods as program budgeting and accountability. Another tool frequently chosen for educational assistance is the modern management information system, a computer-based aid to planning and decisionmaking.

In late 1970, the Los Angeles Unified School District (LAUSD) contracted with The Rand Corporation to design such an information system in support of educational management. The system is specifically intended to aid planning and decisionmaking (through implementation of accountability and program budgeting) in schools partially supported by Title I provisions of the Elementary and Secondary Education Act.

This report describes a program for in-service training of the users of the information system. The in-service training program is designed to insure that the decisionmaker is aware of the information he must have to make his decisions in an effective manner. This report is the sixth (and final) report in the series describing the work carried out. The other volumes in the series are the following:

- J. A. Farquhar and B. W. Boehm, *An Information System for Educational Management*, Vol. I: *Design Considerations*, R-930-LACS. Defines near-term information system requirements, design guidelines, major design constraints, and information needs of educational decisionmakers.
- M. L. Rapp, *An Information System for Educational Management*, Vol. II: *Data Requirements for Accountability*, R-931-LACS. Defines the future shape of the accountability system and feasible long-term trends and requirements in the areas of research and evaluation.
- T. S. Donaldson, *An Information System for Educational Management*, Vol. III: *Data Requirements for Evaluation: A Review of Educational Research*, R-932-LACS. Reviews and discusses

the literature concerning student evaluation, providing direction for eventual information system growth.

- J. A. Farquhar, D. H. Stewart, J. Lombaerde, *An Information System for Educational Management*, Vol. IV: *Functional Design*, R-933-LACS. A functional description of the proposed information system, specifying input and output data, file formats, and necessary processing.
- J. A. Farquhar, I. M. Iwashita, S. H. Landa, *An Information System for Educational Management*, Vol. V: *A Design for Implementation*, R-934-LACS. Describes and discusses alternative hardware, software, and support configurations that might provide the desired services, and the costs and benefits of each.

SUMMARY

The information system for the Los Angeles City School District has been designed to provide relevant information in a readily available and concise manner. Equally important to the effectiveness of the information system, however, is that the decisionmaker have the capability to actually use the information. This report describes an in-service training program that will help insure that the decisionmaker has the necessary tools to process the information provided by the system in a productive manner.

The course content of the program covers the basic concepts and tools needed in order to use the information generated. Special emphasis is given to an orientation to the information system in terms of its inputs and outputs. A format for conducting the in-service training program is suggested. This format includes the time period of instruction, the method, the materials and the nature of the participants and the staff.

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I. INTRODUCTION

This report describes an in-service training program for implementation of the prototype information system designed by The Rand Corporation for the Los Angeles Unified School District (LAUSD). The information system is for use at the individual school and classroom level, and this is reflected in the in-service training program. The impact of decisions made at the school level on decisionmaking at other levels was a primary consideration in the design of the training program because the prototype information system was intentionally designed to be extended to other operational levels within the LAUSD.

In developing the in-service training program, the concern was with the analytical aspect of decisionmaking--the kinds of analysis that would be done by staff members, the problems they would encounter, the tools they would need, and especially the data they would use.

Preliminary considerations in the design of the training program are presented in Sec. II. General guidelines for the substance and format of the training program are developed from a study of the decisions that are implied in the information system. General classes of decisions are defined and the necessary skills to use the information system to illuminate those decisions are delineated. Constraints, such as time and cost, that will affect the training program are also considered.

Section III outlines the training program. The program consists of four parts--basic concepts, basic tools, use of the information system, and integrating workshops. For each part, a list of readings is provided along with a description of the content and purposes of each reading in the context of the training program. In cases where material is not presently available, proposed syllabus material is presented in outline form. The integrating workshops will be run on the case method, but they have not yet been completely specified. This is intentional; to be effective, the training program needs to develop case material that is relevant and timely to the type of decisions being faced in the LAUSD. It is planned that the preparation of case material will take place concurrently with the implementation of the information system.

II. THE DESIGN OF THE IN-SERVICE TRAINING PROGRAM

RATIONALE

The school principal is a logical focal point in the flow of information within the LAUSD and in the implementation of the information system. Being close to the classroom interaction of teachers and students, the principal is in a position to provide an active link between the classroom level and either the area or district level of decisionmaking. The in-service training program capitalizes on this linkage by designing the content of the program primarily to support the school principal; the content is, however, sufficiently broad to cover the needs of other levels of decisionmaking. Additional, more highly-focused material can be incorporated in the training program to serve the needs of other staff members as they become more actively involved.

The principal should be provided with the basic concepts and tools of analysis so that he can make more meaningful decisions about programs, staffing, student achievement, and resource use within the school. In addition, the data should be transformed into information relevant to the decisionmaking needs of other educational levels, such as area, district, and state. The in-service training program is designed to develop this analytical capability and, thus, insure the effective use of the information system.

The training program has two general characteristics--substance and format. For an efficient program, both the substance and format of the training program should flow from the requirements of the decisionmaker for technical skills, and the constraints imposed on the training program by the operating environment in which the LAUSD finds itself. The general considerations that shaped the substance and format of the proposed in-service training program are reviewed here.

SUBSTANCE

The substance of the training program is derived from the required technical skills needed for decisionmaking and the inventory of skills likely to be possessed by the personnel to be trained. Since there is

no readily available inventory of the present administrators' technical skills, some judgments were made based on discussions with LAUSD personnel and from other experience in the training of school personnel.

Table 1 presents a matrix of the type of decisions or functions that the information system will service and the technical knowledge that should be applied in the decision process. Each x in the matrix designates the types of tools that the decisionmaker must have to fully utilize the information system for each type of decision.

No attempt has been made to identify the decisionmaker in each case. Many staff personnel will have had a part in shaping the information for the decisionmaker. It is especially important that those who implement the decision should understand the basis for the decision. For these reasons, in-service training should be appropriate for all those involved in the decisionmaking process and should not be limited to the decisionmakers only.

A discussion of how this matrix of decisions or functions was developed is helpful to understanding the matrix itself. This can be illustrated by a delineation of the skills necessary for *program selection* in the planning function. The decisionmaker needs to determine the resource implications and benefits of alternative educational programs. Some of the things that he must consider are the following:

1. What is the basic framework for program selection (basic concept--systems analysis)?
2. Toward what objective is the program directed (basic concept--program budgeting)?
3. How are costs and benefits to be estimated (basic tools--statistical analysis, resource and effectiveness analysis)?
4. How can the problems be put in systematic form so that the implications of various assumptions can be revealed (basic tool--modeling)?
5. Which costs are relevant to this decision (basic tool--resource analysis)?
6. How are benefits to be measured (basic tool--effectiveness analysis)?

Table 1

FUNCTION TRAINING MATRIX

	Basic Concepts			Basic Tools						
	Systems Analysis	*Planning Programming and Budgeting*	*Account-ability*	*Statistical Analysis*	*Modeling*	*Resource Analysis*	*Effectiveness Analysis*	*Evaluation/ Research*	*Information System Orientation*	*Integrating Workshops*
Planning and research										
Establish goals and objectives		X	X						X	X
Design alternative programs	X	X							X	X
Select programs	X	X		X	X	X	X		X	X
Establish performance criteria		X	X						X	X
Develop budget		X							X	X
Identify points of accountability		X	X	X				X	X	X
Establish evaluation strategy		X						X	X	X
Allocate resources	X			X	X	X	X		X	X
Administration										
Monitor educational outcomes	X	X	X	X			X	X	X	X
Monitor expenditures	X	X	X	X		X		X	X	X
Allocate discretionary resources	X	X		X	X	X	X		X	X
Report progress to public	X	X	X						X	X
Report average daily attendance									X	
Allocate maintenance resources	X	X		X	X	X	X		X	X
Instruction										
Establish instructional strategy		X	X		X	X	X		X	X
Evaluate educational progress		X	X	X		X	X		X	X
Counseling										
Determine cause of referral									X	
Counsel students			X						X	

The purpose of the training is not to make the decisionmaker an expert in the use of the various tools and concepts that are introduced; rather it is to expose the decisionmaker to what is available, under what situations it can be used, and most importantly, what its limitations are. If, for example, most program analysis is performed by a central group at the district level, the principal should know what this group can do for him and be able to interpret the results from such analysis. Moreover, he should be able to apply the analytical thinking that is inherent in much of the training material to decisions that he must make on a daily basis. Analysis comes in many forms; often, the least complex is the most useful in handling the many management problems of a school.

FORMAT

The format of this training program is dictated by the many constraints that are imposed on the LAUSD. A full year, in-residence course in systems analysis for school principals, for example, may make a large contribution to the better management of the school system. It is surely not the best alternative available, however, when the cost (staff time and dollars) of the program is considered. Costs aside, it is not feasible because there is no way to free the principals for such an extended period of off-site training.

These constraints have an impact on (1) length of time of instruction, (2) method of instruction, (3) instructional material, (4) training session participants, and (5) instructional staff.

Time of Instruction

Since principals or other district staff cannot be gone for long periods of time during the school year, the training program is designed either for intensive instruction in a single period or a series of short sessions during the school year.

Method of Instruction

The emphasis of the training session is on the case method of instruction. In this method, the participants combine their own basic

knowledge of decisionmaking with knowledge gained through simulated decision exercises. As a result, the case method allows the participants to gain from each other's thoughts and experiences. This interaction will be especially important in illustrating the possibilities and limitations in the implementation and use of the information system.

The more technical subjects will be taught by the lecture method. Even in those areas, however, the emphasis will be on examples of the technical tools in use. The objective will be to increase *understanding* of the tool and not necessarily the *use* of the tool.

Training Material

Since the method of instruction will mainly be case discussion, most of the background material will have to be learned out of class. A package of material should be developed that can be read by the participants in order to prepare them for the case sessions. The case sessions can then concentrate on demonstrating the use and limitations of the material in practice.

Training Session Participants

The training session should include a cross-section of the personnel that will be involved in operating and using the information system. This will allow the various participants to see the total picture of how the information is generated and who uses the various types of information for what purposes. The particular class mix is left to the LAUSD after considering the cost and time available of prospective participants.

Instructional Staff

Whether the LAUSD needs to hire a consultant to conduct part of the training is a question of the availability of district personnel and money. Since much of the material will be case material, however, it is clear that any consultant must work closely with the LAUSD in its development. The LAUSD must be willing to devote some personnel time to the development of the training course if a consultant conducts the sessions.

III. THE IN-SERVICE TRAINING PROGRAM

The course content of the training program is divided into the following categories:

1. Basic concepts.
2. Basic tools.
3. Information system orientation.
4. Integrating workshops.

A syllabus is suggested for each part of each category. In addition, some of the reading materials to be used in each part of the course are shown in Table 2.*

BASIC CONCEPTS

This part of the training program introduces the participant to the planning and administrative concepts that were used in the design of the information system. The purpose is not only to present new types of planning techniques, but to contrast the new with the old in order to give the participant an appreciation of how any differences in the planning methodology will help him perform his job more effectively. Three basic concepts will be covered: systems analysis, planning-programming-budgeting, and accountability. The material to be presented for each concept is discussed below.

Systems Analysis

While much has been published concerning the systems approach in education, much of it is not suited for the training program. Some material is too lengthy for the limited purpose of introducing the subject of systems analysis. Other material is too one-sided in its praise of systems analysis to be of use to the educational manager who must be aware of all the limitations involved. Thus, material must be specially prepared for the training program.

*See the Bibliography for complete references.

Table 2

SELECTED READING MATERIALS FOR IN-SERVICE TRAINING PROGRAM IN SUPPORT OF THE INFORMATION SYSTEM

	Basic Concepts			*Basic Tools*					
Readings[*]	*Systems Analysis*	*PPBS*	*Account-ability*	*Statistical Analysis*	*Modeling*	*Resource Analysis*	*Effectiveness Analysis*	*Evaluation/ Research*	*Information Systems*
Systems Analysis and Education, RM-2473	X								
Program Budgeting for School District Planning, RM-6116	X	X			X	X	X	X	
PPBS-Manual, State Advisory Commission, California		X							
Cost-effectiveness Analysis for Educational Planning, P-4327									
Project R-3, San Jose: Evaluation of Results and Development of Cost Model, R-672				X	X	X	X	X	
Measures of School Performance, R-488									X
Analysis of Educational Programs Within a Program Budgeting System, P-4195	X				X	X			
An Evaluation Design for San Jose USD's Compensatory Education Program, RM-5903							X	X	
The Value of Teachers in Teaching, RM-6362				X				X	
The Evaluation of Equality of Educational Opportunity, P-3911	X			X				X	
Evaluation as Feedback in the Program Development Cycle, P-4066								X	
An Approach to Developing Accountability Measures for the Public Schools, P-4464			X						
Every Kid a Winner			X						
Experimental and Quasi-experimental Designs for Research								X	
An Information System for Educational Management,									
Vol. I			X						X
Vol. II			X					X	
Vol. III								X	
Vol. IV									X
Vol. V									X
Vol. VI	X	X							

[*] Complete references are given in the Bibliography.

Systems Analysis Syllabus

I. The Systems Approach.

A. Definition. The systems approach and how it differs from traditional planning methods.

B. Benefits and Costs of the Systems Approach.

C. Limitations of the Systems Approach for Educational Management.

1. Problems in measurement.
2. Distribution of costs and benefits.

II. Critical Analysis of the Systems Approach in Use.

An example of the systems approach in education will be examined for its impact on the decision process. How was the decision changed because of systems analysis? What were the weaknesses in the analysis? How much reliance can be put on quantitative studies?

III. Case Study.

Planning-Programming-Budgeting System

The nature of the planning-programming-budgeting system (PPBS) is explored in this part of the training program. The emphasis is on the data required for the system, the information generated by the system, and the program analysis aspects of an operational PPBS. In particular, the differences between the traditional budgeting methods and the budgeting component of PPBS are delineated.

Planning-Programming-Budgeting System Syllabus

I. The Nature of PPBS.

A. The components of PPBS.

B. The use of PPBS.

C. Comparison with traditional planning and budgeting methods.

D. Data requirements.

II. Program Structure.

A. Theoretical considerations in developing the structure.

B. Examples of program structures.

C. Merits of alternative structures.

III. Program Analysis.

A. Analysis of resources and cost.

B. Analysis of effectiveness.

C. Cost-effectiveness.

Accountability

The basic arguments for accountability, a description of how accountability can be made operational, and the details of the relationship of the information system accountability provide the basic content of this section of the course.

Accountability Syllabus

I. Concept of Accountability.

A. Characteristics of accountability.

B. Purpose.

II. Development of Accountability.

A. Data requirements.

B. The structural aspect of accountability.

C. Development of measures.

III. Relationship of Accountability to the Information System.

BASIC TOOLS

Basic concepts are concerned with what should be done in the planning process. In order to implement the basic concepts, however, the decisionmaker will need, in many cases, additional tools. The more important of these tools are discussed in this part of the training program.

Resource Analysis

In estimating the cost of various programs, it is important to know which types of cost are relevant to the decision toward which the analysis is directed. The syllabus material illustrates the cost concepts in educational planning. With the use of an example, the syllabus material integrates the concepts of PPBS with the modeling and statistical analysis tools necessary for educational planning.

Resource Analysis Syllabus

I. Definition of a Program.
II. Development of Analytical Framework.
III. Estimation of Resource Requirements.
IV. Estimation of Program Cost.
V. Sensitivity Analysis.
VI. Case Study.

Statistical Analysis

The published material on statistical techniques has either of two faults. First, most of the material is too technical to meet the needs of most administrators. Second, the material is usually not directed toward examining the usefulness of statistical analysis in education. Therefore, the development of the course material is both written at the appropriate technical level and designed for use by education managers.

Statistical Analysis Syllabus

I. Descriptive Statistics.
II. Hypothesis Testing.
III. Regression Analysis.
    A. The type of problem where regression analysis is most useful.
    B. The scatter diagram.
    C. Choosing the functional form.

D. Fitting the curve.

E. Prediction--measures of confidence.

F. Sensitivity analysis.

IV. Case Study.

Evaluation/Research

It is suggested that parts of the Campbell and Stanley book* be used in the training program because of its exposition of the validity of various research designs. The intent is not to explore the processes and techniques of educational research in depth; rather it is to develop an understanding of the assumptions that must be made if the research results are to be accepted in the decision process. The problems encountered with a variety of research designs are well documented in this book.

Syllabus material consists of cases to which the participant can apply what was learned from the reading. The results of various research designs will be given, and the participant will then interpret the results.

Effectiveness Analysis

The participant is given an overview of effectiveness analysis in education. The emphasis is on methods and techniques required for the analysis of educational outcome. The participant is provided with data and is required to interpret the results.

Effectiveness Analysis Syllabus

I. Data Requirements.

A. Types of data needed.

B. Sources.

II. Measures of Effectiveness.

A. Achievement measures.

B. Other measures.

*Donald T. Campbell and Julian C. Stanley, *Experimental and Quasi-Experimental Designs for Research*, Rand McNally, Chicago, Illinois, 1966.

III. Analysis of Effectiveness.

A. Structuring the analysis.

B. Conducting the analysis.

C. Interpreting the results.

IV. Case Study.

Modeling

A general introduction to the design and purpose of models in education is provided. Examples of how models of school district operations can be formulated and used are described. The syllabus material covers the development of such models, the use of such models, and the limitations of these models in educational planning.

Modeling Syllabus

I. Benefits and Limitations of Models.

II. Model Development.

A. Identifying the outputs of the model.

B. Identifying the inputs of the model.

1. Data problems.

2. Selecting policy variables.

C. Relating Inputs to Outputs.

III. Examples of Models in Use.

IV. Case Study.

INFORMATION SYSTEM ORIENTATION

This part of the in-service training program will provide the participants with a working knowledge of the information system. The informational content of all reports generated as outputs of the system will be described. The participants are required to identify the data sources for information and the appropriate analytical concepts and skills necessary to support decisions in their area of responsibility.

This part of the training program is designed to give the participants an appreciation of the impacts of the information on decisions made in other functional areas and at other decisionmaking levels.

Information System Orientation Syllabus

I. The Information System.

   A. Data requirements (inputs).
   B. Reports (outputs).

II. Information Content of Reports.

   A. Personnel.
   B. Program/budget.
   C. Classroom/evaluation.
   D. Community status.

III. User Interface with Information System.

   A. Teacher.
   B. Principal.
   C. Administrative levels (within district).
   D. Educational system (extra-district).

INTEGRATING WORKSHOPS

During the implementation phase of the project, exercises related to the problems involved in using the information system will be carried out. These exercises are to be used by the participants to further their understanding of how the information system enters into the decision process. An important function of the integrating workshops is to assess how well the information system supports the decisionmaking process and to determine how the information system might be changed to better meet the needs of its users.

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